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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/866,434	05/29/2001	Zhineng Fan	HCD-107	5987

7590 09/13/2002

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EXAMINER

NORRIS, JEREMY C

ART UNIT	PAPER NUMBER
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2827

DATE MAILED: 09/13/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/866,434

Applicant(s)

FAN ET AL.

Examiner

Jeremy Norris

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 August 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-34 is/are pending in the application.
- 4a) Of the above claim(s) 18-34 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 May 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-17, drawn to a printed circuit board, classified in class 174, subclass 262.
- II. Claims 18-34, drawn to a method of making a printed circuit board, classified in class 29, subclass 852.

The inventions are distinct, each from the other because of the following reasons:

Inventions II and I are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the device of the invention of group I could be formed by an additive process as opposed to the subtractive process claimed in the invention of group II.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

Because these inventions are distinct for the reasons given above and the search required for Group II is not required for Group I, restriction for examination purposes as indicated is proper.

During a telephone conversation with Mr. Mark Levy (29,188) on 29 August 2002 a provisional election was made with traverse to prosecute the invention of group I, claims 1-17. Affirmation of this election must be made by applicant in replying to this Office action. Claims 18-34 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Drawings

The drawings are objected to because the sectional views are not properly cross-hatched (see MPEP 608.02). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

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The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

Applicant is reminded of the proper content of an abstract of the disclosure.

A patent abstract is a concise statement of the technical disclosure of the patent and should include that which is new in the art to which the invention pertains. If the patent is of a basic nature, the entire technical disclosure may be new in the art, and the abstract should be directed to the entire disclosure. If the patent is in the nature of an improvement in an old apparatus, process, product, or composition, the abstract should include the technical disclosure of the improvement. In certain patents, particularly those for compounds and compositions, wherein the process for making and/or the use thereof are not obvious, the abstract should set forth a process for making and/or use thereof. If the new technical disclosure involves modifications or alternatives, the abstract should mention by way of example the preferred modification or alternative.

The abstract should not refer to purported merits or speculative applications of the invention and should not compare the invention with the prior art.

Where applicable, the abstract should include the following:

- (1) if a machine or apparatus, its organization and operation;
- (2) if an article, its method of making;
- (3) if a chemical compound, its identity and use;
- (4) if a mixture, its ingredients;
- (5) if a process, the steps.

Extensive mechanical and design details of apparatus should not be given.

The abstract of the disclosure is objected to because its comparisons with the prior art and the use of the phrase "The present invention features". Correction is required. See MPEP § 608.01(b).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

Claims 1, 2, 10, and 12-17 are rejected under 35 U.S.C. 102(b) as being anticipated by US 5,880,590, granted to Desai et al. (hereafter Desai).

Desai discloses, referring to figure 1, a low cost, high reliability interposer (30) for use in electronic packages, comprising:

- a) at least one dielectric layer having one major surface and at least one edge;
 - b) a plurality of conductive pads (38), each having a first and second surface, spaced apart on said major surface of said at least one dielectric layer, said first surface of said conductive pads being plated with at least one layer of metal (see col.5, lines 25-35), and at least a portion of said second surface of said conductive pads being readily adaptable for connection to a conductive member;
 - c) a plurality of openings (32) with a non-uniform cross section, each one corresponding to and aligned with one of said conductive pads; and
 - d) a plurality of conductive members (42), each one located within one of said openings and in electrical contact with said portion of said second surface of said conductive pads
- [claim 1], wherein said at least one dielectric layer comprises an insulative material
- [claim 2], wherein said plurality of openings comprises a stepped cross section [claim

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10], wherein said conductive members comprise solder [claims 12, 13, 14], further comprising alignment means to align said carrier to a structure adapted to mate therewith (see abstract) [claim 15], wherein said interposer may be attached to a structure adapted to mate therewith by a reflow process [claims 16, 17].

Regarding specifically claim 17, since the limitation "wherein said reflow process of said interposer to said structure is performed under uniform pressure" is a process limitation in a product claim, it is well settled that the presence of process limitations in product claims, which product does not otherwise distinguish over the prior art, cannot impart patentability to that product. (*In re Thorpe*, 227 USPQ 964, 1966)

Claims 1-3, 7, and 11-17 are rejected under 35 U.S.C. 102(e) as being anticipated by US 6,428,328, granted to Haba et al. (hereafter Haba).

Haba discloses, referring to figure 22, a low cost, high reliability interposer (102) for use in electronic packages, comprising:

- a) at least one dielectric layer (104) having one major surface and at least one edge;
- b) a plurality of conductive pads (124), each having a first and second surface, spaced apart on said major surface of said at least one dielectric layer, said first surface of said conductive pads being plated with at least one layer of metal (126), and at least a portion of said second surface of said conductive pads being readily adaptable for connection to a conductive member;
- c) a plurality of openings (110) with a non-uniform cross section, each one corresponding to and aligned with one of said conductive pads; and

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d) a plurality of conductive members (116), each one located within one of said openings and in electrical contact with said portion of said second surface of said conductive pads [claim 1], wherein said at least one dielectric layer comprises an insulative material [claim 2], wherein said insulative material is polyimide (see col. 8, lines 15-20) [claim 3], wherein said conductive pads comprise copper (see col. 8, lines 25-30) [claim 7], wherein said plurality of openings comprises a tapered cross section [claim 11], wherein said conductive members comprise solder [claims 12, 13, 14], further comprising alignment means to align said carrier to a structure adapted to mate therewith (see col. 7, lines 40-60) [claim 15], wherein said interposer may be attached to a structure adapted to mate therewith by a reflow process [claims 16, 17].

Regarding specifically claim 17, since the limitation "wherein said reflow process of said interposer to said structure is performed under uniform pressure" is a process limitation in a product claim, it is well settled that the presence of process limitations in product claims, which product does not otherwise distinguish over the prior art, cannot impart patentability to that product. (*In re Thorpe*, 227 USPQ 964, 1966)

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

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the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Haba in view of US 6,219,253, granted to Green (hereafter Green).

Haba discloses the claimed invention as described above with respect to claim 2, except Haba does not specifically state that the insulative material is a liquid crystal polymer. However, it is well known in the art that liquid crystal polymer and polyimide are interchangeable dielectric materials as evidenced by Green (see col. 5. line 60 - col. 6, line 5). Therefore, it would have been obvious, to one having ordinary skill in the art, at the time of invention, to use a liquid crystal polymer for the insulative material in the invention of Haba as is known in the art and evidenced by Green. The motivation for doing so would have been to use a widely available known dielectric. Moreover, it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Haba in view of US 5,984,691, granted to Brodsky et al (hereafter Brodsky).

Haba discloses the claimed invention as described above with respect to claim 2, except Haba does not specifically state that the insulative material is a epoxy-glass-based. However, it is well known in the art that epoxy-glass and polyimide are interchangeable dielectric materials as evidenced by Brodsky (see col. 6. lines 25-40). Therefore, it would have been obvious, to one having ordinary skill in the art, at the time of invention, to use epoxy-glass for the insulative material in the invention of Haba as is known in the art and evidenced by Brodsky. The motivation for doing so would have been to use a widely available known dielectric. Moreover, it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Haba in view of US 6,332,782, granted to Bezama et al. (hereafter Bezama).

Haba, discloses the claimed invention as described above with respect to claim 2 except Haba does not specifically state that the insulative material has a coefficient of thermal expansion (CTE) that substantially matches the CTE of the material to which it is to be attached. However, Bezama teaches that it is advantageous to match the CTE of the interposer material with the materials of the parts it is joined to (see col. 2, lines 15-40). Therefore, it would have been obvious, to one having ordinary skill in the art, at the time of invention, to match the CTEs of the materials in the invention of Haba as taught by Bezama. The motivation for doing so would have been to favorably alter the stress and/or strain distributions between the joined parts.

Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Desai in view of US 4,553,192, granted to Babuka et al (hereafter Babuka).

Desai discloses the claimed invention as described above with respect to claim 1, except Desai does not specifically state that the first surface of said conductive pads being plated with at least one layer of metal is plated with nickel [claim 8], wherein said first surface of said conductive pads being plated with at least one layer of metal is also plated with gold [claim 9]. However, Babuka teaches plating gold and nickel over a contact pad (see col. 3, lines 15-25). Therefore, it would have been obvious, to one having ordinary skill in the art, at the time of invention, to coat the conductive pads of the invention of Desai, with gold and nickel as taught by Babuka. The motivation for doing so would have been to reduce wear on the BGA chip carrier.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following documents are representative of the current state of the art:

US 4,029,375	Gabrielian,
US 5,818,700	Purinton,
US 5,893,765	Farnworth,
US 6,044,548	Distefano et al..


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeremy Norris whose telephone number is 703-306-

5737. The examiner can normally be reached on Mon.-Th., 9AM - 6:30 PM and alt. Fri. 9AM-5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L. Talbott can be reached on 703-305-9883. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-7724 for regular communications and 703-305-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

JCSN
September 8, 2002


DAVID L. TALBOTT
SUPERVISORY PATENT EXAMINER
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